

Amendments to the Claims

Claim 1 (Withdrawn): A method of screening animals to determine those more likely to produce larger litters comprising:

obtaining a sample of genetic material from said animal; and

assaying for the presence of a genotype in said animal which is associated with increased litter size, said genotype characterized by the following:

- a) a polymorphism in the PRKAG3 gene.

Claim 2 (Withdrawn): The method of claim 1 wherein said polymorphism results in an amino acid change from valine to isoleucine at amino acid number 199 of the PRKAG3 gene or its equivalent as determined by a BLAST comparison of SEQ ID NO:2.

Claim 3 (Withdrawn): The method of claim 1 wherein said polymorphism is a transition of a guanine to an adenine at nucleotide position 595 or its equivalent.

Claim 4 (Withdrawn): The method of claim 1 wherein said genotype is a BsaHI polymorphism.

Claim 5 (Withdrawn): The method of claim 1 wherein said step of assaying is selected from the group consisting of: restriction fragment length polymorphism (RFLP) analysis, heteroduplex analysis, single strand conformational polymorphism (SSCP), denaturing gradient gel electrophoresis (DGGE) and temperature gradient gel electrophoresis (TGGE).

Claim 6 (Withdrawn): The method of claim 1 wherein said animal is a pig.

Claim 7 (Withdrawn): The method of claim 1 further comprising the step of amplifying the amount of the PRKAG3 gene or a portion thereof which contains said polymorphism.

Claim 8 (Withdrawn): The method of claim 7 wherein said amplification includes the steps of:

Selecting a forward and a reverse sequence primer capable of amplifying a region of the PRKAG3 gene which contains a polymorphic BsaHI site.

Claim 9 (Withdrawn): The method of claim 8 wherein said forward and reverse primers are selected from and based upon primer RNF and primer RNR.

Claim 10 (Currently amended): A method of screening animals for a genotype associated with litter size and meat quality traits such as color, pH level, marbling, and drip loss, to determine those more likely to exhibit improved meat quality traits comprising: obtaining a biological sample of material from said an animal; and assaying said sample ~~for the presence of~~ a PRKAG3 genotype comprising at least one polymorphic allele, wherein said PRKAG3 genotype encodes a polypeptide having at least 95% sequence identity to SEQ ID NO:2, and is characterized by a nucleic acid sequence which encodes a polypeptide having in said animal which is associated with improved meat quality traits said genotype characterized by the following:

a) ~~polymorphism in the PRKAG3 gene, said polymorphism resulting in and characterized by an amino acid of valine at position 199 and arginine at position 200, or an isoleucine at position 199 when an arginine is at position 200 in SEQ ID NO:2 or at an equivalent position in SEQ ID NO:2 when aligned in a Blast comparison using default parameters,~~

thereby screening for or against animals having said traits.
or its equivalent as determined by a BLAST comparison of SEQ ID NO:2.

Claim 11 (Currently amended): The method of claim 10 wherein said polymorphism is a transition of a guanine to an adenine at nucleotide position 595 of SEQ ID NO:1 or a nucleotide sequence having substantial sequence similarity to SEQ ID NO:1 as measured using BLAST sequence comparison algorithm or its equivalent.

Claims 12-13 (Cancelled)

Claim 14 (Original) The method of claim 10 further comprising the step of amplifying the amount of PRKAG3 gene or a portion thereof which contains said polymorphism.

Claim 15 (Original): The method of claim 14 wherein said amplification includes the steps of: selecting a forward and a reverse sequence primer capable of amplifying a region of the PRKAG3 gene which contains a polymorphic BsaHI site.

Claim 16 (Currently amended): The method of claim 14 wherein said forward and reverse primers are selected from SEQ ID NO:16 and SEQ ID NO:17~~and based upon Primer RNF and primer RNR.~~

Claim 17 (Withdrawn): A method of screening animals to determine those more likely to exhibit improved meat quality traits comprising:

obtaining a biological sample of material from said animal; and
assaying for the presence of a genotype in said animal which is associated with improved meat
quality traits said genotype characterized by the following:

- a) a polymorphism in the PRKAG3 gene, said polymorphism resulting in and
characterized by an amino acid change of asparagine to threonine at amino acid
position 30 or its equivalent as determined by a BLAST comparison of SEQ ID
NO:1.

Claim 18 (Withdrawn): The method of claim 17 wherein said polymorphism is a transition
of an adenine to cytosine at nucleotide position 89 or its equivalent as determined by a BLAST
comparison of SEQ ID NO:1.

Claim 19 (Withdrawn): The method of claim 17 wherein said genotype is a StyI polymorphism.

Claim 20 (Withdrawn): The method of claim 17 wherein said step of assaying is selected
from the group consisting of:
restriction fragment length polymorphism (RFLP) analysis, minisequencing, MALD-TOF, SINE,
heteroduplex analysis, single strand conformational polymorphism (SSCP), denaturing
gradient gel electrophoresis (DGGE) and temperature gradient gel electrophoresis
(TGGE).

Claim 21 (Withdrawn): The method of claim 20 wherein said animal is a pig.

Claim 22 (Withdrawn): The method of claim 20 further comprising the step of amplifying
the amount of PRKAG3 gene or a portion thereof which contains said polymorphism.

Claim 23 (Withdrawn): The method of claim 22 wherein said amplification includes the
steps of:
selecting a forward and a reverse sequence primer capable of amplifying a region of the
PRKAG3 gene which contains a polymorphic StyI site.

Claim 24 (Withdrawn): The method of claim 23 wherein said forward and reverse primers
are selected from and based upon Primer RF1 and primer RN52R2.

Claim 25 (Withdrawn): A method of screening animals to determine those more likely to exhibit improved meat quality traits comprising:
obtaining a biological sample of material from said animal; and
assaying for the presence of a genotype in said animal which is associated with improved meat quality traits said genotype characterized by the following:
a) a polymorphism in the PRKAG3 gene, said polymorphism resulting in and characterized by an amino acid change of glycine to serine at amino acid position 52 or its equivalent as determined by a BLAST comparison of SEQ ID NO:1.

Claim 26 (Withdrawn): The method of claim 25 wherein said polymorphism is a transition of a guanine to an adenine at nucleotide position 154 or its equivalent as determined by a BLAST comparison of SEQ ID NO:1.

Claim 27 (Withdrawn): The method of claim 25 wherein said genotype is a HphI polymorphism.

Claim 28 (Withdrawn): The method of claim 25 wherein said step of assaying is selected from the group consisting of:
restriction fragment length polymorphism (RFLP) analysis, minisequencing, MALD-TOF, SINE, heteroduplex analysis, single strand conformational polymorphism (SSCP), denaturing gradient gel electrophoresis (DGGE) and temperature gradient gel electrophoresis (TGGE).

Claim 29 (Withdrawn): The method of claim 25 wherein said animal is a pig.

Claim 30 (Withdrawn): The method of claim 28 further comprising the step of amplifying the amount of PRKAG3 gene or a portion thereof which contains said polymorphism.

Claim 31 (Withdrawn): The method of claim 30 wherein said amplification includes the steps of:
selecting a forward and a reverse sequence primer capable of amplifying a region of the PRKAG3 gene which contains a polymorphic HphI site.

Claim 32 (Withdrawn): The method of claim 30 wherein said forward and reverse primers are selected from and based upon Primer RF1 and primer RN52R2

- Claim 33 (Withdrawn): A nucleotide sequence which encodes upon expression an PRKAG3 protein, further comprising a serine at position 52.
- Claim 34 (Withdrawn): The nucleotide sequence of claim 33 comprising SEQ ID NO:5.
- Claim 35 (Withdrawn): A PRKAG3 protein according to claim 33.
- Claim 36 (Withdrawn): The protein of claim 35 comprising SEQ ID NO:6.
- Claim 37 (Withdrawn): A nucleotide sequence which encodes upon expression an PRKAG3 protein, said protein comprising a isoleucine at position 199 and an arginine at position 200 or the equivalent thereof, of said protein.
- Claim 38 (Withdrawn): A PRKAG3 protein according to claim 37.
- Claim 39 (Withdrawn): A nucleotide sequence which encodes upon expression an PRKAG3 protein, said protein comprising an isoleucine at position 199, a threonine at position 30 a glycine at position 52 and an arginine position 200 or the equivalent thereof, of said protein.
- Claim 40 (Withdrawn): A PRKAG3 protein according to claim 39.
- Claim 41 (Withdrawn): A nucleotide sequence which encodes upon expression an PRKAG3 protein, said protein comprising a valine at position 199 and an arginine at position 200 or the equivalent thereof, of said protein.
- Claim 42 (Withdrawn): A PRKAG3 protein according to claim 41.
- Claim 43 (Withdrawn): A nucleotide sequence which encodes upon expression an PRKAG3 protein, said protein comprising an isoleucine or valine at position 199 and an arginine at position 200 or the equivalent thereof, of said protein.
- Claim 44 (Withdrawn): A PRKAG3 protein according to claim 43.

Claim 45 (Currently amended): A method of screening animals to determine those more likely to have favorable meat quality traits comprising:
obtaining a sample of biological genetic material from said an animal; and
assaying the PRKAG3 protein in said sample, wherein said protein has at least 95% sequence identity to SEQ ID NO:2 and is characterized by for the presence of a genotype in said animal which is associated with favorable meat quality traits, said genotype characterized by a threonine at amino acid position 30, a glycine at amino acid position 52 and an isoleucine at amino acid position 199 in SEQ ID NO:2 or at an equivalent position when aligned to SEQ ID NO:2 in a Blast comparison using default parameters, wherein the presence of said threonine at amino acid position 20, glycine at amino acid position 52 and isoleucine at amino acid position 199 is indicative of said animal possessing favorable meat quality traits comprising color, pH level, marbling, and drip loss,
the following:
a threonine at amino acid position 30, a glycine at amino acid position 52 and an isoleucine at amino acid position 199.

Claim 46 (Currently amended): A method of screening animals to determine those more likely to have favorable meat quality traits comprising:
obtaining a sample of biological genetic material from said an animal, said animal having at least 95% sequence identity to SEQ ID NO:2; and
assaying the PRKAG3 protein in said sample for the presence of a genotype in said animal which is associated with favorable meat quality traits, said genotype characterized by the following:
an isoleucine at position 199 and an arginine at position 200 in SEQ ID NO:2 or at an equivalent position in SEQ ID NO:2 as determined by a Blast comparison using default parameters, wherein the presence of said isoleucine at position 199 and arginine at position 200 is indicative of an animal having a lower level of glycogen, lactate, and glycolytic potential, higher ham and loin pH and favorable color scores,
thereby screening for or against animals more likely to have favorable meat quality traits.

Claim 47 (Withdrawn): A method for identifying a genetic marker for meat quality and/or litter size in animals comprising the steps of:
determining the number of offspring produced by each female animal or the meat quality of said animal;

determining the polymorphism in the PRKAG3 or equivalent gene of each animal; said polymorphism comprising the polymorphism of claim 1,7,17,or 11 or their equivalents and associating the number of offspring produced by each female animal or meat quality with said polymorphism thereby identifying a polymorphism for animal meat quality or litter size.

Claim 48 (Withdrawn): The method of claim 47 further comprising the step of selecting animals for breeding which are predicted to have favorable meat quality or litter size by said marker.

Claim 49 (Withdrawn): The method of claim 48 wherein said analysis comprises digestion of PCR amplified DNA with a restriction enzyme selected from the group consisting of BsaHI, HphI, and StyI.

Claim 50 (Withdrawn): A method for screening animals to determine those with a favorable combination of traits for meat quality and/or litter size, which method comprises of the steps:

determining the alleles of PRKAG3 present in a animal said alleles comprising those which include one or more of the following a polymorphic BsaHI, HphI, or StyI site in the PRKAG3 gene;
determining the alleles of other markers for genes known to affect meat quality and/or litter size;
and
selecting for animals with favorable combinations of alleles and against those carrying unfavorable combinations.

Claim 51 (Withdrawn): The method of claim 50 wherein the determination of PRKAG3 alleles comprises determining the presence of at least one allele associated with at least one DNA marker linked either directly or indirectly to PRKAG3 .

Claim 52 (Withdrawn): The method as claimed in claim 51 wherein the DNA marker is a microsatellite.

Claim 53 (Withdrawn): A method of screening animals to determine those with favorable meat quality traits comprising:
obtaining a sample of genetic material from said animal; and

assaying for the presence of a genotype in said animal which is associated with favorable meat traits, said genotype characterized by the following:

- a) a polymorphism in the PRKAG3 gene, said polymorphism being one other than the RN⁻ mutation at amino acid 200.

Claim 54 (Currently amended): A method of screening animals to determine those more likely to have favorable meat quality traits comprising:
obtaining a sample of biological genetic material from said an animal; and
assaying the PRKAG3 gene for the presence of a genotype in said animal which is associated with favorable meat quality, said genotype characterized by a combination of at least two polymorphisms in the an PRKAG3 encoded gene product, wherein said combination of least two polymorphisms is indicative of an animal having favorable meat quality traits.

Claim 55 (Currently amended): A method of screening animals to determine those more likely to have increased value for litter size and/or meat quality traits comprising:
obtaining a sample of biological genetic material from said an animal; and
assaying for the presence of a genotype in said animal which is associated with favorable litter size and/or meat quality, said genotype characterized by a combination of at least two polymorphisms in the PRKAG3 encoded gene product, wherein said combination of at least two polymorphisms is indicative of an animal having increased value for litter size and/or meat quality traits.

Claim 56 (Currently amended): A method of screening animals to determine those more likely to have favorable meat quality traits comprising:
obtaining a sample of biological genetic material from said an animal; and
assaying from said sample the PRKAG3 protein for the presence of a genotype amino acid changes in said animal which is are associated with favorable meat quality traits comprising color, pH level, marbling, and drip loss, said genotype amino acid changes are characterized by the following:
a threonine at amino acid position 30, a serine at amino acid position 52 and a valine at amino acid position 199 in SEQ ID NO:2 or at an equivalent position as measured by a Blast comparison using default parameters.

Claim 57 (Withdrawn): A method of screening animals to determine those more likely to exhibit improved meat quality traits and or larger litter size comprising:
obtaining a biological sample of material from said animal; and

assaying for the presence of a genotype in said animal which is associated with said traits said genotype characterized by the following:

- a) a short interspersed element polymorphism in the PRKAG3 gene.

Claim 58 (Withdrawn): The method of claim 57 wherein said assay comprises the step of amplifying the PRKAG3 gene using primers selected from and based upon primer RP1F and primer PN52R2.

Claim 59 (New): A method of screening animals to determine whether an animal is more likely to produce a larger litter size when bred, the method comprising:
obtaining a biological sample from an animal; and
assaying said sample for a PRKAG3 genotype comprising a polymorphic allele, wherein said PRKAG3 genotype encodes a polypeptide having at least 95% sequence identity to SEQ ID NO:2, said allele is correlated to variation in litter size and characterized by a nucleic acid sequence which encodes a polypeptide having an amino acid change of a valine to isoleucine at position 199 in SEQ ID NO:2 or at an equivalent position in SEQ ID NO:2 as determined by a Blast comparison using default parameters, said amino acid change is associated with an animal more likely to produce a larger litter size when bred, thereby screening for or against animals more likely to produce a larger litter.

Claim 60 (New): The method of claim 61 wherein said animal is a pig.